Claims (amendments highlighted)

1. Impeller device for data acquisition in a flow, comprising a support (3) to hold a spindle (2) around which the impeller (1) is fitted, wherein:

- the two bearing blocks (4.1, 4.2) are mounted on the support (3) such that one (4.1) of the bearing blocks is fixed and the other (4.2) is free to move with respect to said support;

- the bearing blocks (4.1, 4.2) are made from a material with the lowest possible coefficient of friction and each comprise an approximately conical recess (6) into which one of the ends (5) of the spindle (2) fits;

- the ends of the spindle (2) are approximately conical; and

- said impeller device also comprises means (9) of forming a predetermined clearance (j) between the bearing blocks (4.1, 4.2) and the spindle (2).

2. Device according to claim 1, wherein the mobile bearing block (4.2) is crimped in a base (4.3).

3. Device according to claim 1 or 2, wherein the bearing blocks (4.1, 4.2) are made from a material chosen from among alumina, corundum, diamond and sapphire.

4. Device according to any one of claims 1 to 3, wherein the means (9) of forming the predetermined clearance (j) between the bearing blocks (4.1, 4.2) and the spindle (2) comprise:

- a stop (11) to be inserted in the support (3),
- means of blocking (12) the stop (11) with respect to the support (3) and,
- a removable shim (10), the thickness of which corresponds to the clearance (j),

the shim (10) being slid into the support (3) between the stop (11) and the mobile bearing (4.2) placed in a position with almost no clearance with the spindle (2),

the shim (10) being removed when the stop (11), forced into contact with the shim (10) is blocked with respect to the support (3), allowing the mobile bearing block (4.2) to occupy another position in which it replaces the shim (10).

5. Device according to claim 4, wherein the stop (11) is a sleeve with a longitudinal slit and the blocking means (12) are a screw that expands the split sleeve radially.

6. Device according to any one of claims 1 to 3, wherein the means of forming the clearance (j) between the bearing blocks (4.1, 4.2) and the spindle (2) comprise:

- a stop (32) to be inserted in the support (3), the stop (32) and the mobile bearing block (4.2) being provided with a dog (37) that controls the clearance (j),
- means (39) of blocking the stop (32) with respect to the support (3) when it is forced into contact with the mobile bearing block (4.2) placed in an approximately clearance free position with the spindle (2), without being engaged,
- means (30, 35) of displacing the mobile bearing block (4.2) in another position in which it is engaged and to hold it in the other position.

7. Device according to claim 6, wherein the means for displacing the mobile bearing block (4.2) comprise a rod fixed (30) on the mobile bearing block (4.2) that passes through the stop (32) and that is free to move in rotation and a return spring (35) around the rod (30), pressing on the stop (32) at one end and fixed to the rod (30) at the other end.

8. Device according to any one of claims 1 to 7, wherein the support (3) is in the form of a stirrup.

9. Device according to claim 8, wherein the support (3) is made of Inconel.

10. Device according to any one of claims 1 to 9, wherein it comprises a rotation velocity sensor (8) for the impeller (1) housed in the support (3) and placed in the spindle of the impeller (1).

11. Process for installation of an impeller (1) on a support (3) for data acquisition in a flow, wherein it comprises the following steps:

fixing a fixed bearing block (4.1) on the support (3),

positioning a mobile bearing block (4.2) in a first position on the support (3), the mobile bearing block (4.2) being sufficiently far from the fixed bearing block (4.1) to put the spindle (2) of the impeller (1) between them, the bearing blocks (4.1, 4.2) each comprising an approximately conical recess (6),

placement of the spindle (2) of the impeller (1), this spindle (2) being provided with approximately conical end pieces (5), each of them fitting in a recess (6),

positioning of the mobile bearing block (4.2) in a second position, in a clearance free stop in contact with the spindle (2),

solidarisation of a stop (11, 32) with respect to the support (3), this stop (11, 32) will cooperate with the mobile bearing block (4.2), its position taking account of a predetermined clearance (j) to be formed between the mobile bearing block (4.2) and the spindle (2),

displacement of the mobile bearing block (4.2) to a third position that moves it away from the fixed bearing block (4.1) by the predetermined clearance (j) and which brings it into contact with the stop (11, 32).

12. Process according to claim 11, wherein it comprises a step to insert a shim (10) determining the clearance (j) in the support (3) between the mobile bearing block (4.2) and the stop (11) before the solidarisation step and a step to remove the shim (10) after the solidarisation step but before the displacement step.

13. Process according to claim 11, wherein the displacement step of the mobile bearing block (4.2) includes a step in which the mobile bearing block (4.2) is engaged with the step (32), the dog determining the clearance.

14. Data acquisition instrument in a flow, wherein it comprises at least one device according to one of claims 1 to 10.

Claims

1. Impeller device for data acquisition in a flow, comprising a support (3) to hold a spindle (2) around which the impeller (1) is fitted, wherein:

- the two bearing blocks (4.1, 4.2) are mounted on the support (3) such that one (4.1) of the bearing blocks is fixed and the other (4.2) is free to move with respect to said support;
- the bearing blocks (4.1, 4.2) are made from a material with the lowest possible coefficient of friction and each comprise an approximately conical recess (6) into which one of the ends (5) of the spindle (2) fits;
- the ends of the spindle (2) are approximately conical; and
- said impeller device also comprises means (9) of forming a predetermined clearance (j) between the bearing blocks (4.1, 4.2) and the spindle (2).

2. Device according to claim 1, wherein the mobile bearing block (4.2) is crimped in a base (4.3).

3. Device according to claim 1 or 2, wherein the bearing blocks (4.1, 4.2) are made from a material chosen from among alumina, corundum, diamond and sapphire.

4. Device according to any one of claims 1 to 3, wherein the means (9) of forming the predetermined clearance (j) between the bearing blocks (4.1, 4.2) and the spindle (2) comprise:

- a stop (11) to be inserted in the support (3),
- means of blocking (12) the stop (11) with respect to the support (3) and,
- a removable shim (10), the thickness of which corresponds to the clearance (j),

the shim (10) being slid into the support (3) between the stop (11) and the mobile bearing (4.2) placed in a position with almost no clearance with the spindle (2),

the shim (10) being removed when the stop (11), forced into contact with the shim (10) is blocked with respect to the support (3), allowing the mobile bearing block (4.2) to occupy another position in which it replaces the shim (10).

5. Device according to claim 4, wherein the stop (11) is a sleeve with a longitudinal slit and the blocking means (12) are a screw that expands the split sleeve radially.

6. Device according to any one of claims 1 to 3, wherein the means of forming the clearance (j) between the bearing blocks (4.1, 4.2) and the spindle (2) comprise:

- a stop (32) to be inserted in the support (3), the stop (32) and the mobile bearing block (4.2) being provided with a dog (37) that controls the clearance (j),
- means (39) of blocking the stop (32) with respect to the support (3) when it is forced into contact with the mobile bearing block (4.2) placed in an approximately clearance free position with the spindle (2), without being engaged,
- means (30, 35) of displacing the mobile bearing block (4.2) in another position in which it is engaged and to hold it in the other position.

7. Device according to claim 6, wherein the means for displacing the mobile bearing block (4.2) comprise a rod fixed (30) on the mobile bearing block (4.2) that passes through the stop (32) and that is free to move in rotation and a return spring (35) around the rod (30), pressing on the stop (32) at one end and fixed to the rod (30) at the other end.

8. Device according to any one of claims 1 to 7, wherein the support (3) is in the form of a stirrup.

9. Device according to claim 8, wherein the support (3) is made of Inconel.

10. Device according to any one of claims 1 to 9, wherein it comprises a rotation velocity sensor (8) for the impeller (1) housed in the support (3) and placed in the spindle of the impeller (1).

11. Process for installation of an impeller (1) on a support (3) for data acquisition in a flow, wherein it comprises the following steps:

fixing a fixed bearing block (4.1) on the support (3),

positioning a mobile bearing block (4.2) in a first position on the support (3), the mobile bearing block (4.2) being sufficiently far from the fixed bearing block (4.1) to put the spindle (2) of the impeller (1) between them, the bearing blocks (4.1, 4.2) each comprising an approximately conical recess (6),

placement of the spindle (2) of the impeller (1), this spindle (2) being provided with approximately conical end pieces (5), each of them fitting in a recess (6),

positioning of the mobile bearing block (4.2) in a second position, in a clearance free stop in contact with the spindle (2),

solidarisation of a stop (11, 32) with respect to the support (3), this stop (11, 32) will cooperate with the mobile bearing block (4.2), its position taking account of a predetermined clearance (j) to be formed between the mobile bearing block (4.2) and the spindle (2),

displacement of the mobile bearing block (4.2) to a third position that moves it away from the fixed bearing block (4.1) by the predetermined clearance (j) and which brings it into contact with the stop (11, 32).

12. Process according to claim 11, wherein it comprises a step to insert a shim (10) determining the clearance (j) in the support (3) between the mobile bearing block (4.2) and the stop (11) before the solidarisation step and a step to remove the shim (10) after the solidarisation step but before the displacement step.

13. Process according to claim 11, wherein the displacement step of the mobile bearing block (4.2) includes a step in which the mobile bearing block (4.2) is engaged with the step (32), the dog determining the clearance.

14. Data acquisition instrument in a flow, wherein it comprises at least one device according to one of claims 1 to 10.